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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,171	11/25/2003	Arthur Gritzky	134368 (SPLG 1028US1)	7013

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EXAMINER	
AZARIAN, SEYED H	
ART UNIT	**PAPER NUMBER**
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/722,171	GRITZKY ET AL.	
	Examiner	Art Unit	
	Seyed Azarian	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 6/6/2007

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 25 November 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

RESPONSE TO AMENDMENT

1. Applicant's arguments, filed, 6/6/2007, see page 2 through 5, of remarks with respect to the rejection of claims 1-20 have been Fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-20, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheehan et al (U.S. patent 6,106,466) in view of Yamauchi (U.S. patent 7,110,583).

Regarding claim 1, Sheehan discloses an apparatus for detecting a contour of an object within an image, comprising (see abstract, delineation of heart contours from image using reconstruction-based modeling);

a user interface for selecting first and second points within an object, said object being within an image (column 13, lines 25-48, tracing of heart borders from images in the set of training data can be assisted by utilizing a surface reconstruction "algorithm" in accord with block 194 in FIG. 10. In this algorithm, the "user selects" a representative subset of the imaging

planes for tracing. The resulting borders are input into the reconstruction algorithm to produce a three-dimensional surface, which estimates the surface that would be obtained using borders traced from all imaging planes in the data set);

and a processor for detecting first and second sub contours based on said first and second points, respectively, said first and second sub contours being based on detected edges (column 8, lines 3-13, producing three-dimensional using processing unit, further lines 22-32, ultrasound imaging using processor, also column 10, lines 16-56, refer to the different points and interface).

However regarding claim 1, Sheehan discloses (column 13, lines 25-48, tracing of heart borders from images in the set of training data can be assisted by utilizing a surface reconstruction "algorithm" in accord with block 194 in FIG. 10. In this algorithm, the "user selects" a representative subset of the imaging planes for tracing. The resulting borders are input into the reconstruction algorithm to produce a three-dimensional surface, which estimates the surface that would be obtained using borders traced from all imaging planes in the data set);
, but does not explicitly state its corresponding "processor combining said first and second sub contours into a contour. On the other hand Yamauchi in the same field of examination of object with ultrasound teaches (Fig. 24A-24C, column 14, lines 7-13 In the above expression, "Eint" represents a function defining internal energy produced by a bend in the curve, "Eimage" represents a function defining energy that pulls the curve toward edges or the like of an image, and "Econ" represents a function defining energy of an external constraining force (edge detection). Further lines 39-67, the initial contour extracting unit 121 then sends the estimated initial contour to the dynamic contour extracting unit 122. The above estimation is performed, for instance, by (1) specifying the same characteristic points (pixels) for the two sets of contour

data, (2) calculating a motion vector based on differentials of coordinates of the specified characteristic points, and (3) calculating coordinates of the characteristic points when they are assumed to move at a fixed speed for a fixed period to estimate the initial contour (refer to points)). Also, Yamauchi states, (Column 16, lines 24-28, image display unit presents images such as the ultrasound image generated by the image processing unit 110 and the object's contour extracted by the automatic contour extracting (sub contours) unit).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Sheehan invention according to the teaching Yamauchi because it would provide a system for detecting the contour of an object within an image using points to detect edges and a processor to combine the sub contours into a final contour image to be displayed.

Regarding claim 2, Sheehan discloses the method of claim 1, said user interface further comprising at least one of a mouse having at least one selectable button, a keyboard, a track ball, a touch screen, and a touch pad (Fig. 2, column 8, lines 7-12, keyboard 58).

Regarding claim 3, Sheehan discloses the method of claim 1, said processor further comprising a preset limit, said pre-set limit defining image subsets with respect to said first and second points, said processor searching said image subsets for said detected edges (column 9, lines 1135, the images are recorded at a plurality of time points in a cardiac cycle, also column 13, line 66 through column 14, line 15).

Regarding claim 5, Sheehan discloses the method of claim 1, said image being based on one of diagnostic ultrasonic, X-ray, CT, and MR data (column 11, lines 4-7, ultrasonic imaging system).

Regarding claim 6, Sheehan discloses the method of claim 1, further comprising a display for displaying at least one of said first sub contour, said second sub contour, and said contour (column 8, lines 3-9, graphics display).

Regarding claim 7, Sheehan discloses the method of claim 1, said user interface further comprising an input for deselecting a point within said contour, said processor defining an updated contour excluding said point (column 16, line 65 through column 17, line12, the feature comparison of features between predicted and observed images, and area assessment are repeated).

Regarding claim 8, Sheehan discloses the method of claim 1, further comprising a display for displaying said first sub contour after said processor detects said first sub contour, said display erasing said first sub contour and displaying said contour after said processor combines said first and second sub contours (Fig. 7, column 11, lines 45-63, images are rearview on graphic display and frames are selected for specific anatomic at certain time. To determine which images were scanned at particular time during the cardiac cycle, and ECG can be recorded for identification of the time points (past) is assisted also by review of the images).

Regarding claim 9, Sheehan discloses a user interactive method for detecting the contour of an object within an image, comprising: selecting a first point within an object using a user interface, said object being displayed within an image; identifying a first sub contour based on said first point; selecting a second point within said object using said user interface; identifying a second sub contour based on said second point; and defining a contour based on said first and second sub contours (see claim 1, also column 13, lines 25-48, user manually selects a representative subset of the image planes for tracing).

Regarding claim 14, Sheehan discloses the method of claim 9, further comprising: selecting a third point using said user interface; defining a third sub contour based on said third point; and calculating an updated contour based on said contour and said third sub contour (column 13, lines 25-47, refer to calculating a candidate border in each plane).

Regarding claim 16, Sheehan discloses the method of claim 9, further comprising: selecting N points within said object using said user interface; identifying N sub contours based on said N points, said contour further comprising being defined based on N sub contours, said contour comprising a closed loop or circle around an interior portion; and updating said contour to include said interior portion (column 13, line 66 through column 26).

Regarding claim 17, Sheehan discloses a method for calculating and/or measuring parameters of an object within an image, comprising: acquiring an image comprising an object, said image further comprising pixel or Voxel data; selecting points within said object using a user interface; searching for edges within said image around said points as said points are selected, said edges being representative of non-uniformities in said pixel or Voxel data, said edges defining sub contours around each of said points; combining said sub contours into a contour as each of said sub contours is defined; and calculating a parameter (see claim 1, also column 7, lines 12-27, determining cardiac parameter, further refer to axis and lines 57-62).

Regarding claim 19, Sheehan discloses the method of claim 17, said image further comprising one of 2D and 3D tissue data. (Fig. 13, column 7, lines 52-55, generate a three-dimensional image).

Regarding claim 20, Sheehan discloses the method of claim 17, further comprising: said acquiring step further comprising acquiring a 3D volume of data; said searching step further

comprising searching for said edges around said points within said 3D volume, said sub contours forming irregularly shaped volumes based on said points; and said combining step further comprising combining said irregularly shaped volumes into said contour, said contour comprising a single irregularly shaped volume (see claim 1, also column14, line53 through column 15, line10, three-dimensional shape).

With regard to claim 4, 10, 11 and 12, the arguments analogous to those presented above for claims 1, 3 and 5 are respectively applicable to claims 10, 11 and 12.

With regard to claim 15, 13 and 18, the arguments analogous to those presented above for claims 1, 8 and 19 are respectively applicable to claims 15, 13 and 18.

Other prior art cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(U.S. patent 5,148,494) to Keskes is cited for process for automatic plotting and assistance interpretation of seismic cross-section in particular using image analysis techniques.

(U.S. patent 5,170,440 to Cox is cited for perceptual grouping multiple hypothesis probabilistic data association.

(U.S. patent 5,566,246) to Rao is cited for system and method for ranking and extracting salient contours for target recognition.

(U.S. patent 6,346,124) to Geiser et al is cited for autonomous boundary detection system for echo cardio graphic images.

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.
Status information about the PAIR system, see http:// pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seyed Azarian
Patent Examiner
Group Art Unit 2624
August 19, 2007